

CLAIMS:

1. A steering apparatus for a vehicle having a steering wheel, the apparatus comprising:

5 a steering mechanism that is mechanically separate from the steering wheel, wherein the steering mechanism includes a steering rod and a steering actuator, wherein the steering actuator drives the steering rod;

10 a steering wheel position detector for detecting a steering position of the steering wheel;

a control system that determines a target steered position of the steering rod based on the detected steering position of the steering wheel, wherein the control system performs feedback control of the steering actuator based on
15 the target steered position and an actual steered position of the steering rod;

a reaction force actuator, wherein the reaction force actuator applies reaction force to the steering wheel based on force that the steering mechanism receives from a road; and

20 an elastic member that couples the reaction force actuator to the steering wheel, wherein the elastic member is located between the steering wheel and the reaction force actuator, and wherein, with respect to the elastic member, a side closer to the steering wheel is referred to as a primary side, and a side closer to the reaction force actuator is
25 referred to as a secondary side,

wherein the steering wheel position detector is located at the secondary side.

30 2. The apparatus according to claim 1, wherein a speed reducing mechanism is located between the reaction force actuator and the elastic member, and wherein the speed reducing mechanism decelerates rotation of the reaction force actuator.

----- 3. The apparatus according to claim 2, wherein the steering wheel position detector is located between the elastic member and the speed reducing mechanism.

5 4. The apparatus according to claim 2, wherein the steering wheel position detector detects as the steering wheel position a rotation angle of a portion of the elastic member that is close to the speed reducing mechanism.

10 5. The apparatus according to claim 4, wherein the elastic member has a portion coupled to the speed reducing mechanism, and wherein the steering wheel position sensor detects a rotation angle of the coupled portion.

15 6. The apparatus according to claim 2, wherein the steering wheel position detector detects a rotation angle of an output shaft of the reaction force actuator.

20 7. The apparatus according to claim 1, further comprising a torque detector that detects elastic deformation of the elastic member, thereby obtaining steering torque applied to the steering wheel, wherein the object of detection by the steering wheel position detector is a portion that is closer to the secondary side than the torque detector is to the
25 secondary side.

8. The apparatus according to claim 1, wherein the elastic member is a torsion bar.

30 9. The apparatus according to claim 1, wherein the steering wheel position detector detects a rotation angle of an output shaft of the reaction force actuator.

35 10. A steering apparatus for a vehicle having a steering wheel, the apparatus comprising:

----- a steering mechanism that is mechanically separate from -----
the steering wheel, wherein the steering mechanism includes a
steered wheel and a steering actuator, wherein the steering
actuator drives the steered wheel;

5 a steering wheel angle detector for detecting a steering
angle of the steering wheel;

 a control system that determines a target steered angle
of the steered wheel based on the detected steering angle of
the steering wheel, wherein the control system performs

10 feedback control of the steering actuator based on the target
steered angle and an actual steered angle of the steered
wheel;

 a reaction force actuator, wherein the reaction force
actuator applies reaction force to the steering wheel based on
15 load that the steering actuator receives from a road through
the steered wheel; and

 an elastic member that couples the reaction force
actuator to the steering wheel; and

20 a torque detector that detects elastic deformation of the
elastic member, thereby obtaining steering torque applied to
the steering wheel,

 wherein the object of detection by the steering wheel
angle detector is a portion that is closer to the reaction
force actuator than the torque detector is to the reaction
25 force actuator.